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## **FSFP-CWDM-XXX-XX**

### **1.25Gbps CWDM SFP Transceiver**

#### **With Digital Diagnostic**

#### **Feature**

- Compliant with SFP Transceiver SFF-8472 MSA specification with internal calibration
- Compliant with proposed specifications for IEEE 802.3z/Gigabit Ethernet
- Up to 1.25Gb/s bi-directional data link
- Single + 3.3V Power Supply
- Uncooled DFB laser transmitter
- 8 channels can be selected from 1470 nm to 1610nm in wavelength
- Clasp Color code for different wavelengths
- Hot Pluggable
- Industry standard small form pluggable (SFP) package
- Duplex LC Connector interface
- Metal enclosure, Low EMI
- Operating temperature 0°C to +70°C
- Class 1 Laser Product Compliant with the Requirements of IEC 60825-1 and IEC 60825-2

#### **Applications**

- ◆ Coarse WDM application
- ◆ Metro Access Rings and Point-to-Point networking for Gigabit Ethernet and Fibre Channel

#### **Description**

The FSFP-CWDM-XXX-XX pluggable transceiver module is a high performance integrated duplex data link for bi-directional communication. It is designed for Coarse Wavelength Division Multiplexing (CWDM) applications at data rates of 1.25/1.0625Gbps. They are available in eight different CWDM wavelengths. Digital diagnostics functions are available via a two wire serial bus.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	Ts	-40		85	°C	
Supply Voltage	VCC	0		6	V	

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Ambient Operating Temperature	T <sub>A</sub>	0		70	°C	
Supply Voltage	VCC	3.15	3.3	3.6	V	
Baud Rate		1.0625		1.25	GBaud	
Total Supply Current	I <sub>S</sub>			300	mA	
Surge Current	I <sub>surge</sub>			+30	mA	

## PERFORMANCE SPECIFICATIONS - ELECTRICAL

0°C < Tc < +70°C; +3.15V < Vcc < +3.6V

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>TRANSMITTER</b>						
CML/PECL Inputs (Differential)	V <sub>in</sub>	400		2500	mV <sub>pp</sub>	AC coupled inputs
Input Impedance (Differential)	Z <sub>in</sub>	85	100	115	ohms	R <sub>in</sub> > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		V <sub>cc</sub> - 1.3		V <sub>cc</sub>	V	
Tx_DISABLE Input Voltage - Low		V <sub>ee</sub>		V <sub>ee</sub> + 0.8	V	
Transmit Disable Assert Time				10	μs	
Tx_FAULT Output Voltage -- High		V <sub>cc</sub> -0.5		V <sub>cc</sub> +0.3	V	I <sub>o</sub> = 400μA; Host V <sub>cc</sub>
Tx_FAULT Output Voltage -- Low		0		0.5	V	I <sub>o</sub> = -4.0mA
<b>RECEIVER</b>						
CML Outputs (Differential)	V <sub>out</sub>	400	800	1200	mV <sub>pp</sub>	AC coupled outputs
Output Impedance (Differential)	Z <sub>out</sub>	85	100	115	ohms	
Rx_LOS Output Voltage - High		V <sub>cc</sub> -0.5		V <sub>cc</sub> HOST	V	I <sub>o</sub> = 400μA; Host V <sub>cc</sub>
Rx_LOS Output Voltage - Low		V <sub>ee</sub>		V <sub>ee</sub> +0.5	V	I <sub>o</sub> = -4.0mA
Data output rise time	t <sub>r</sub>		100	175	ps	20 – 80 %
Data output fall time	t <sub>f</sub>		100	175	ps	20 – 80 %
Total Jitter [ Pk - Pk ]	TJ			130	ps	Measured with 2 <sup>7</sup> - 1 PRBS

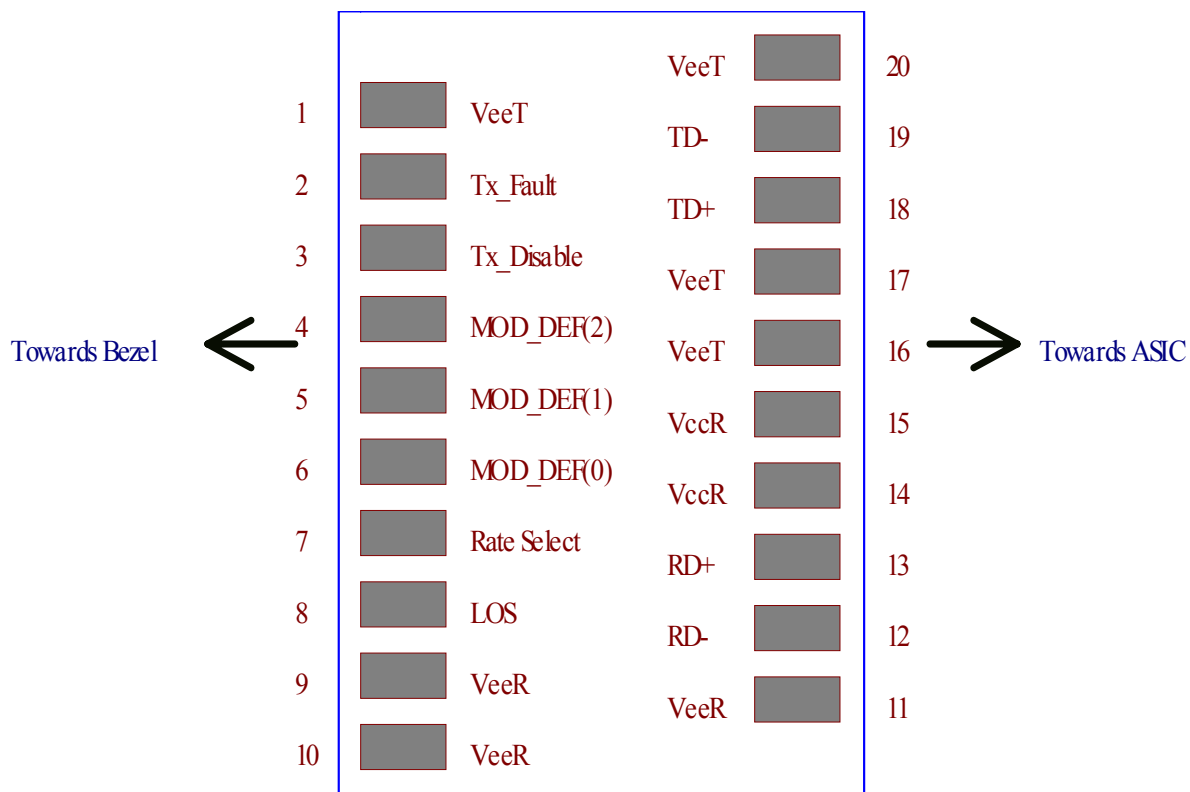
## OPTICAL SPECIFICATIONS

0°C < Tc < +80°C; +3.15V < Vcc < +5.25V

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
<b>TRANSMITTER</b>						
Optical Transmit Power	Po	0		5	dBm	Average
Extinction Ratio	ER	9			dB	P1/P0
Optical Center Wavelength (FSFP-CWDM-XXX-47)	$\lambda_C$	1464	1470	1477.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-49)	$\lambda_C$	1484	1490	1497.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-51)	$\lambda_C$	1504	1510	1517.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-53)	$\lambda_C$	1524	1530	1537.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-55)	$\lambda_C$	1544	1550	1557.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-57)	$\lambda_C$	1564	1570	1577.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-59)	$\lambda_C$	1584	1590	1597.5	nm	
Optical Center Wavelength (FSFP-CWDM-XXX-61)	$\lambda_C$	1604	1610	1617.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-mode Suppression ratio	SMSR	30			dB	
Total Jitter	TJ			100	ps	Measured with 2 <sup>7</sup> - 1 PRBS
Output Rise/Fall Time	tR, tF			180	ps	20-80%; measured unfiltered
<b>RECEIVER</b>						
Optical Center Wavelength	$\lambda_c$	1270		1620	nm	
Average Rx Sensitivity	P <sub>in</sub>		-26	-24	dBm	BER < 1.0E-12 @ 1.25/1.0625GBaud
Optical Input Power-maximum	P <sub>in</sub>			-3	dBm	BER < 1.0E-12 @ 1.25/1.0625GBaud
Optical Return Loss	ORL	12			dB	
RX_LOS - Asserted	Pa	-42			dBm	Measured on transition - Low to High

RX_LOS Deasserted	Pd			-32	dBm	Measured on transition - High to Low
Receiver Jitter Generation (peak to peak)				160	ps	

### SFP Transceiver Electrical Pad Layout



### Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, 2 wire serial ID interface
5	MOD-DEF1	Module Definition 1	3	Note 3, 2 wire serial ID interface











